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ABSTRACT

A project examined the role of the technical education instructor in the implementation and long-term utilization of a learning strategies program designed to improve the skills of military technical training students. The study revealed that teacher participation in learning strategies research implementation produced significant benefits, including creation of a more realistic situation between students and instructors, creation of a team-effort attitude, utilization of instructor expertise, and improved student skill maintenance. Instructors may be productive in all phases of the research program, including conceptualization, design, development, formative evaluation, implementation, summative evaluation, and follow-up and transition. When involving instructors in such programs one must decide how critical issues and questions at each phase will be conveyed to the instructor and use effective communication skills. Training is required for instructors to maximize student acquisition of identified skills. Instructors play a number of important roles in the acquisition of student learning strategies and skills. (A related report focusing on the student in technical training is available separately through ERIC--see note.) (MN)

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Transitioning Learning Strategies Research Into Practice: Focus on The Role of The Technical Training Instructor as A Learning Strategies Expert

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Abstract

Implementation and long term utilization of a learning strategies program are addressed. Lessons learned during an on-going, four year effort to improve the skills of military technical training students via three learning strategies/skill training programs are discussed. The focus is on instructor involvement and its effect on experimental control, instructor affect, the relationship between researcher and instructor, the maintenance of new student skills, and the transition of research programs into practice. Other issues discussed include (a) an approach to stimulating instructor interest and involvement in a program; (b) the instructor training necessary in order to maximize student acquisition of learning strategy skills; and (c) the instructor's role in the acquisition and maintenance of student learning strategies and skills.

Transitioning learning strategies research into practice is essentially an exercise in organizational change and since most people are, at least initially, resistant to change, this can be a very complex task. The unlearning of old and familiar practices and the relearning of new ones often evokes considerable anxiety, insecurity, and resistance on the part of most individuals. Given these realities, effective organizational change necessitates a conscious and deliberate effort on the part of the change agent such that the change process becomes an integral part of the entire program.

After a review of educational research programs, Fullan and Pomfret (1977, p. 394) conclude that "if there is one finding that stands out, it is that effective implementation of social innovations requires time, personal interaction and contacts, in-service training, and other forms of people-based support." Hartley (1979, p. 53) extends this concept by stating that, "Although a project can benefit from the whole-hearted support of top officials in the system, resistance will be less and change is more likely to occur if those affected feel that the project is their own--not one devised and operated by outsiders. Resistance will be less if participants have joined in diagnostic efforts leading them to agree on what the basic problem is and to feel its importance." Diran's (1978) research also supports this approach and his data reveal that system acceptance is more likely (a) if the system is perceived as operating in the interests of various constituencies and (b) if these constituencies have meaningful input into the design, development, and evaluation of the program.

Involving instructors in all phases of a program would, therefore, appear to be an effective technique for transitioning learning strategies research into practice. This extensive type of involvement produces some important implications for not only the learning strategy itself, but also for the evaluation of that strategy. For example, if instructors are to be involved in all phases of a program, the learning strategy will have to be flexible and general enough to withstand the modifications, expansions, and deletions that instructors will make. It will have to be capable of maintaining its inherent effectiveness through numerous revisions and manipulations. Additionally, if instructors are to be involved in all phases of a program, including the evaluation phase, they will become a critical variable in the evaluation design. Conceivably, instructors will be integrally involved in the design and implementation of the strategy. They will also take on the role of facilitating student acquisition of special skills and assisting student maintenance of these skills. In short, an instructor will take on the role of learning strategies expert--an individual who helps students understand, apply, and maintain new learning strategies and skills.

Although these are ambitious suggestions, an on-going learning strategies program which has been in existence for four years, has experienced some degree of success in utilizing them in an operational CMI environment. This program began as most learning strategies programs begin--excluding instructors from the implementation and evaluation, as well as all other phases of the program. As the problems with this approach increased and the first learning

strategies program encountered resistance to transitioning its products into practice, other approaches were investigated. For the second and third learning strategies programs, instructors were involved in all phases of the project. The following sections describe the context in which these learning strategies programs were conducted and discuss four critical issues related to the involvement of instructors in a research project.

The Research Context

The context for the learning strategies programs described in this paper was the Air Force Advanced Instructional System (AIS), which is a prototype, multimedia, computer based instructional system designed to improve the effectiveness and efficiency of Air Force technical training and to provide an operational research facility for evaluating innovations in instructional technology. Military trainees learn their respective course materials via self-paced, individualized, and computer-managed instruction.

During the period of the development of the AIS (1973-1977), it became apparent that many students experienced problems adapting to this system. In a CMI environment, students are expected to (a) be attentive and motivated; (b) make learning meaningful by the appropriate use of learning strategies and skills; (c) practice personal responsibility skills required for self-initiated, self-directed, and self-paced learning; (d) interact effectively with both their peers and their instructors; and (e) set appropriate course and life goals. In the Fall of 1976, under the funding auspices of the

Defense Advanced Research Projects Agency's (DARPA) Learning Strategies Program, the analysis of student learning strategy/skill training needs was begun.

Learning Strategies Skill Training Materials

Three sets of learning strategies skill training materials have been developed over the course of four years. The first set of materials consisted of two lessons which were designed to explain the requirements and expectations of a self-paced, individualized, and computer-managed instructional environment (Dobrovolny, McCombs, & Judd, 1979; McCombs, Dobrovolny, & Judd, 1979). Lesson one, entitled Orientation to CMI, compares and contrasts the characteristics of a typical CMI environment with those of a conventional lockstep environment and details the behaviors of successful versus unsuccessful CMI students. The lesson also explains the concept of negative and positive self-talk and how these behaviors can effect performance. The second lesson, entitled Time Management, describes the philosophy, characteristics, and operation of the individualized course completion prediction that is given to each student enrolled in an AIS course. The lesson explains how students can use this information to manage their time in the course. Basic time management concepts are described and a charting technique for promoting self-monitoring and self-management of ones learning progress is presented.

The second set of materials developed consisted of four lessons, a questionnaire and an instructor orientation and training program. These

products were designed to facilitate student acquisition of active learning strategies and effective study skills. The four lessons addressed cognitive skill areas identified as troublesome for students in CMI: Reading Comprehension, Memorization, Test Taking, and Concentration Management. The philosophy generally emphasized in these lessons is that learning and remembering new information becomes easier if the student changes it in such a way as to make it meaningful to him or her. The questionnaire, entitled Study Skills Questionnaire (SSQUES), evaluates student perceptions of their study skills in the areas of reading comprehension, memorization, test taking, and concentration management. The purpose of this measure is to predict student performance on AIS course materials and to identify those students in need of specific kinds of study skills remediation. The instructor orientation and training package will be described in the next section of this paper.

The third set of learning strategies materials, which are currently being developed, focus on effective techniques for creating positive motivation, personal responsibility, and life coping skills. These materials, which consist of seven individually packaged, self-instructional modules and an instructor orientation and training package, address general student skill deficiencies in the conative, affective, and cognitive domains (McCombs & Dobrovolny, Note 1). The titles of the modules are: Introduction, Values Clarification, Career Development, Goal Setting, Effective Communication, Stress Management, and Problem Solving. The instructor orientation and training package will be described in the next section of this paper.

All of these learning strategies skill training materials are presented in a printed, self-instructional format. The lessons range in length from about 30 minutes to about four hours to complete.

Following the initial self-instructional skill training, students are trained to use three general types of skill maintenance techniques. First, students are instructed in the use of specific self-monitoring, self-charting, or self-recording techniques. Second, students are taught various self-reward techniques and third, students are encouraged to rely on their instructor as a learning strategies expert and as someone who can assist them in understanding and maintaining particular skills.

To Include or Not Include Instructors in Applied Learning Strategies Research: The Trade-Offs

Throughout the history of the AIS, numerous new strategies have been implemented into the learning center, including the three learning strategies programs discussed earlier. With the exception of the two most recent learning strategies programs, these new strategies have been implemented without the active involvement of instructional personnel in either the implementation or evaluation of the program. The results were consistently characterized by initial dramatic effects but a diminishing of these effects as soon as the program was transitioned to military course personnel. For example, before the evaluation of the first learning strategies program, the average course completion time for students enrolled in the course was approximately

27 days. During the evaluation of this program, the average course completion time dropped to approximately 23 days. Within two months of this evaluation, however, the average course completion time was up to approximately 25 days.

By excluding instructional personnel from the implementation and evaluation of the program, it was not necessary to control for instructor effects. Additionally, control over experimental procedures was increased. It is important to point out, however, that the control established was far removed from "experimental control" in the true sense of the word. In an operational--on-going--learning environment, strict experimental control is impossible to achieve. One simply cannot control all of the variables such that two groups of students are identical except for the treatment they receive.

The control which was established in our first program was, therefore, a crude approximation of what a researcher would ideally like to have. What it cost us was not worth what was gained. A respectable implementation and evaluation strategy was gained but at the expense of creating an artificial setting and precipitating a great deal of instructor mistrust and anger.

By excluding the instructors from the implementation and evaluation phases of the program we created an atypical situation. Instructors assisting students is the normal situation in a learning center or classroom. Even in a self-paced environment, the instructor helps students clarify, practice, and apply new concepts and skills. By not explaining to the instructors the techniques and concepts we were trying to teach the students, we created a very artificial situation which made the replicability, generalizability, and representativeness of our findings somewhat questionable.

By excluding the instructors from the implementation and evaluation phases of the program, we also created feelings of mistrust and anger among the instructors. Since instructors were not informed about the skill training packages being implemented in their learning centers, a "We-They" attitude quickly developed. Instructors began to create their own information to fill the void left by the lack of information provided them by the researchers. This information was often inaccurate and inappropriate and it perpetuated the "We-They" attitudes.

In the second learning strategies program, instructors were involved in all phases of the program--from the conceptualization of the program through the implementation, evaluation, and transition of the program. This approach produced five significant benefits. First, by creating a more realistic situation between students and instructors, the generalizability of the results was greatly increased. Second, involving instructors in all phases of a program created a team-effort attitude. Instructors viewed the program as "theirs." They understood the program, and having invested time, effort and creativity into it, they were often eager to make it work and, once it was proven to be effective, to make it a permanent part of their training program.

Third, instructors are experts in their own right and by involving them in the program, it was possible to greatly benefit from their expertise. For example, since most instructors intimately knew and understood most of their students, they knew how to exemplify theoretical concepts with believable, interesting, and challenging applications. They often had good ideas,

suggestions, and comments that made the materials attractive to their students. Instructors also provided valuable information about obstacles and barriers likely to occur in the implementation stage, and issues to be considered when developing the evaluation design.

The fourth important benefit realized by involving instructors in the experimental program relates to the area of student skill maintenance. When instructors know, understand, and can apply the concepts that the experimental program is trying to teach students, they can provide a valuable skill maintenance tool. They can answer student questions about the skills, provide students with new and different applications of the skills, and periodically remind students of how and when to use these skills. In fact, a truly effective instructor can be one of the most effective maintenance tools that a researcher can find.

The fifth important benefit realized by involving instructors in the experimental program relates to the issue of transition. That is, when an experimental program proves effective, instructors who were involved in the program from its inception are often more than willing to institute the materials and procedures as permanent aspects of their classroom or learning centers. Again, if they view the program as "theirs," they will naturally want to incorporate it into their daily operations. Adapting an experimental program to an operational program becomes relatively easy for instructors who are interested in the program, know how and why it works, and are proud of it. If instructors have not been included in the program, they are likely to view it's operationalization as a considerable threat--a threat which they will often fight.

Although much was gained by including instructors in all phases of our second learning strategies skill training program, there were some costs. First, we had less control over experimental procedures. On at least one occasion, evaluation data was lost due to a misunderstanding of procedures. Second, due to the positive reaction of instructors to being included in all phases of the program, a "halo effect" was probably operating. Third, it was impossible to separate the effects of the learning strategies skill training materials from the effects of individual instructors.

Figure 1 summarizes the costs and the benefits of including versus excluding instructors in all phases of applied learning strategies research. As can be seen, both approaches have their merits and their drawbacks. If one desires to transition a research program into practice, the benefits of involving instructors in all phases of the program seem to outweigh the costs.

FIGURE 1

Benefits vs. Costs of Instructor Involvement on Applied Learning Strategies Research

	BENEFITS	COSTS
NO INSTRUCTOR INVOLVEMENT	1. No need to control for instructor effects 2. More control over experimental procedures	1. Creation of artificial setting 2. "We-They" attitude, mistrust, etc. 3. Effects influenced by affect 4. Instructor expertise is lost 5. Instructors can not help students maintain their new skills
INSTRUCTOR INVOLVEMENT	1. More externally valid data 2. Team-effort; "We" attitude 3. Capitalize on instructor expertise 4. Maintenance of student skills 5. Built-in transition mechanism	1. Less control over experimental procedures 2. Effects influenced by affect 3. Difficult to separate learning strategy effects from instructor effects

Approach to Stimulating Instructor Interest and Involvement

Based on our experience, we have evolved an approach to applied learning strategies research which includes instructors in all phases of the research program. Instructors can be productive team members beginning with the conceptualization of the program, through the design, development, implementation, and evaluation of the program, and ending with the transition of the program.

Our experience also indicates that the best technique for productively involving instructors in all phases of a program is to recognize that instructors are experts in their area. In each phase of the program, it is important to explain to them the objectives, possible problems and constraints, and then ask for their input. In the following few pages, the critical concepts to be covered and questions to ask at each phase of a program will be identified.

Conceptualization. The critical issues to be explained to instructors during the conceptualization phase of a program are the (1) researchers' involvement or interest in the research program; (2) general purpose objectives, or goals of the program (e.g., to see if a learning strategies approach to student learning problems can be effective in this setting); (3) the anticipated future or schedule of the program; and (4) the instructor's role in this program (i.e., an involved team member).

Critical questions to ask instructors include:

- What kinds of students often experience problems in your classroom or learning center?
- What kinds of problems do students often experience in your classroom or learning center?
- What kinds of students often do well in your classroom or learning center?
- What techniques or strategies do you use to help poorly performing students? How well do these strategies work?
- What other techniques do you wish were available?

During the design, development, implementation, and evaluation phases of a program, the critical issues to be discussed with instructors are the (1) results of the previous phase; (2) goals and purpose of the current phase of the program; and (3) schedule and time frame of the current phase. Critical questions to ask instructors during these four phases are listed below.

Design Questions. (After reviewing the report or outline the researchers wrote summarizing the findings of the conceptualization phase and making recommendations for design guidelines.)

- How do you feel about the results of the conceptualization phase?
- Do you think any important concepts or data were missed?
- What treatments do you think would be effective given the data?
- What do you think is the best approach?

Development Questions. (After reviewing the design guides for the skill training program.)

- Is this what you had in mind?
- What needs to be changed?
- What needs to be added?
- What problems may this create?
- How can these problems be solved?
- What is the best format or media for these materials?
- Do you think these materials will be successful?

Formative Evaluation Questions. (After reviewing the materials developed.)

- How do you like the materials?
- What needs to be changed?
- Do you like the format?
- Is it clearly written?
- Would this information be useful to students?

(After using the materials for several weeks in their classroom or learning center.)

- How are the materials working?
- What problems do you have with the materials?
- What changes, modifications, or revisions need to be made?

Implementation Questions. (When planning the summative evaluation.)

- What is the best way to implement this product?
- What is the best time for implementing this product?
- What procedures are required for implementing this product?
- What problems will implementing this product produce?
- Are any major course changes or other changes likely to occur during the planned evaluation period?

Summative Evaluation Questions. (During summative evaluation.)

- How are the materials working?
- How are the procedures for using the materials working?
- What are some of the problems you are having with the materials?
- What are some of the successes you have experienced using these materials?

(When summative evaluation has been completed.)

- How well did the materials work?
- Did the students like the materials?
- Did the students benefit from the materials?
- Did students understand the materials?
- What would be your overall rating of the materials?
- What changes need to be made in the materials?
- How could these materials be used on a permanent basis?

Follow up and Transition. After the summative evaluation has been completed, it is very important to call a meeting of the instructors who participated in the program and explain to them the results of the evaluation. It is also important to provide them with information on the following questions, thereby giving them the necessary closure for the program.

- Is the product theirs to use?
- Is the product going to be adopted permanently?
- Is the product going to be evaluated again? If so, when and where?

It is also appropriate to cite instructors who participated in the program in the forward of the final report and then to provide those instructors with a copy of the report.

Issues to be Considered When Involving Instructors in Applied Learning Strategies Research

There are three general issues to keep in mind when involving instructors in all phases of a program. First, it is important to decide whether instructors are going to be asked to volunteer for the program or if they are going to be required to participate. Numerous researchers have noted the importance of this evaluation question in student skill training programs (Dalton & Allen, 1979; Kanfer & Grim, 1978; Komaki & Dore-Boyce, 1978), and it appears equally true that the same issues would be relevant for the instructors. Using volunteers allows one to have a small group of dedicated, motivated, and active instructors (or students). On the other hand, this

small group of participants sometimes compromises the generalizability of the program to other instructor and student groups. Requiring instructors to participate increases the opportunity to randomly select instructors representative of the larger instructor population of the program. This approach can, however, cause reluctance and resistance on the part of instructors who feel pressured into participating. If instructors are forced to participate, there is likely to be less enthusiasm for and internalizing of the program and procedures are more likely to be ignored or forgotten. The trade-off, then, in deciding whether to use instructor volunteers is weighing the costs versus benefits of forcing participation (the negative attitudes, the disregard for established procedures vs. representative instructor group) against the costs versus benefits of using volunteers (positive attitudes, compliance with procedures vs. potentially biased group). In our judgement and experience, the scale tips heavily in favor of using instructor volunteers.

The second general issue to consider when involving instructors in a program is how the critical issues and questions at each phase of the program are going to be conveyed to the instructors. Although it is perhaps possible and efficient to use printed handouts and questionnaires to dispense and collect the appropriate information, "research has shown time and again that there is no substitute for the primacy of personal contact among implementers and between implementers and planner/consultants, if the difficult process of unlearning old roles and learning new ones is to occur" (Fullan and Pomfret, 1977). Face to face, personal contact was used in this program and was deemed to be most effective.

If one decides to convey information to and ask questions of instructors via face-to-face contact, the next general issue to consider is a strategy for meeting with them. Three options are available: (1) Instructors can be brought together in a group; (2) instructors can be met with individually, on a one-to-one basis; or (3) both group and individual sessions can be utilized. Our experience indicates that the third alternative provides the most benefits.

When explaining the critical issues of the conceptualization phase to instructors, it is often not only efficient, but also effective to address a group of instructors. A sense of "group"--a "we" feeling--can be developed and the internalization process can begin. Group sessions are also beneficial for involving instructors in the summative evaluation and the followup and transition phase of the program. During the summative evaluation phase, group sessions are productive because they give instructors the opportunity to share ideas, exchange case histories, successes and failures, and again participate in a "we" feeling--a support group. These group sessions also give the researcher the opportunity to insure that the evaluation procedures are understood and being followed uniformly. For the follow up and transition phase of the program, group sessions are beneficial because the purpose of this phase is basically to debrief the participating instructors--to outline the final results and future of the program. A feeling of closure and perhaps even some mutual congratulations can be enhanced by the use of a group during this phase of the program.

Individual, one-to-one, sessions have been found to be most effective for collecting answers to critical questions because they avoid the "peer pressure" and need for conformity that is often felt when a group of individuals get together. We have found that the answers we get from instructors to the critical questions asked them at each phase of the program (except during the summative evaluation when a group session affords the instructors the opportunity to benefit from each others' experiences) are most beneficial, useful and truthful when we ask these questions on an individual basis.

As was mentioned earlier, we have found that it is beneficial to use a group session to discuss the critical issues of the conceptualization and followup and transition phases. Group sessions might also be an efficient technique for explaining the critical issues of all of the other phases of the program. We decided to explain these issues on a one-to-one basis because of the difficulty of getting the participating instructors together. Explaining these issues to them individually proved to be beneficial in that we could individualize our presentation to each instructor and help him or her understand these issues. Explaining this information on an individual basis was also productive in that it provided an effective introduction and closure for the critical questions at each phase.

The third general issue to address when involving instructors in all phases of a program is the importance of effective communication skills on the part of the researchers. Employing "active listening" techniques; avoiding "yes - no" questions (which result in "yes - no" answers); and avoiding judgemental, defensive, or emotional reactions is critical to facilitating truthful, accurate, and therefore, meaningful instructor involvement.

Training Required for Instructor Personnel to Maximize Student Acquisition of Identified Skills

Our experience indicates that in order for an instructor to be able to explain a concept or strategy to a student, he or she must have experienced some past success in applying the concept or strategy. In order to provide instructors with this type of experience, formative evaluation can be structured such that instructors read through the materials as if they were students completing all of the exercises and questions. After meeting with the researcher and individually answering the critical questions for the formative evaluation, all of the participating instructors meet in a group with the researcher to discuss the materials, discuss how and why the materials work, expand on the concepts and strategies, demonstrate other applications, and generate new examples.

Another useful technique for helping instructors maximize student acquisition of specific skills is to establish periodic--perhaps weekly--meetings with instructors to discuss any problems, insights, or successes they have experienced. Again, the emphasis is on sharing, discussing, and exchanging information among instructors and between instructors and researchers.

Discussing or reviewing with instructors the developmental needs and conflicts of the student population is a third effective technique for helping instructors maximize student acquisition of specific skills. Although many instructors have studied these concepts in the past, it is often very

beneficial to review those which are relevant and applicable to the student population being addressed. This can result in not only an understanding for why the program is important and potentially effective, but also in an ability to individualize the materials in the program to meet the need of various students in the classroom or learning center.

A fourth technique for helping instructors maximize student acquisition of specific skills is to help the instructor identify with the student. Having instructors complete unfinished sentences such as, "When I was a student I...," "My favorite instructor in school was...," and "If I were a student today, I..." can sensitize them to the feelings of their students and this, in turn, can help them present the new skills and information to their students in relevant and meaningful ways.

Instructor's Role in the Acquisition and Maintenance of Student Learning Strategies and Skills

Instructors generally can help students acquire and maintain new skills in six different ways:

First, instructors can help students apply the new skills to new situations; demonstrate new applications; and, provide new and different examples.

Second, instructors can model the new skills, showing students how they, as instructors, apply, implement, and make use of the new skills.

Third, instructors can remind students of how and when to use the new skills in new situations. They can also increase the amount of practice that students experience in using these new skills by creating new situations which call for the use of these skills.

Fourth, instructors can monitor the progress charts or maintenance charts that students are required to keep as part of the skill training. This insures not only that the students maintain these charts, but also allows the instructor to provide individual guidance to those students who need additional assistance in understanding and applying the new skills, or maintaining the charts.

Fifth, instructors can provide a very effective and consistent reward system for students participating in the new program. Again, personal contact is a strong force and can be used by instructors to motivate students.

Finally, instructors can make the new skills to be learned enjoyable, entertaining, and even profitable for their students. By calling out the unusual, the humorous, or even the "sexy" aspects of the new skills, instructors can help students easily and quickly remember the new skills.

Transitioning learning strategies research into practice was noted, at the beginning of this paper, to be an exercise in organizational change. An effective technique for catalyzing this change is to involve instructors in all phases of the program such that they internalize the program and view it as their own. The benefits of this type of instructor involvement far outweigh the costs. With a team-effort--"we" attitude--instructors and researchers can combine their expertise to produce effective skill

training materials. Instructors can become learning strategies experts and provide a highly effective maintenance function. Finally, with a team-effort, instructors and researchers can transition learning strategies research into practice with a minimum amount of stress and conflict.

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